DOCUMENT RESUME

ED 229 037 IR 050 212

TITLE Biological & Medical Sciences Libraries Section. Special Libraries Division. Papers.
INSTITUTION International Federation of Library Associations, The Hague (Netherlands).
PUB DATE Aug 82
NOTE 29p.; Papers presented at the Annual Meeting of the International Federation of Library Associations (48th, Montreal, Canada, August 22-28, 1982).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Cataloging; Computer Programs; Interlibrary Loans; *International Organizations; Library Acquisition; Library Associations; Library Automation; *Library Networks; *Medical Libraries; *Shared Services; Union Catalogs; *Videodisc Recordings
IDENTIFIERS *Biomedical Information Services; Book Exchange; Electronic Publishing

ABSTRACT

These two papers on the subjects of videodisc technology and medical library networking were presented at the 1982 International Federation of Library Associations (IFLA) conference. The first, "Videodisc Technology and Applications" by Earl Henderson (United States), examines the videodisc player and the premastering (five-function process: image capture, processing, signal encoding, assembly, and simulation) of audiovisual material to produce an interactive audiovisual videodisc with entertainment, educational, and electronic publishing applications. Also included is an overview of different videodisc systems and their mutual interchangeability. Both software development and the audiovisual production process are covered. The second, "The Medical Library Center of New York [MLCNY]: An Independent, Privately-Funded Network" by William D. Walker, describes the establishment of the center as a pioneer in biomedical information networking, and its membership structure and financing. Also described are MLCNY programs and services involving interlibrary lending; serials exchange; cooperative acquisitions and cataloging; automated serials control; and the production of union lists of medical serials, monographs, and nonprint items. The paper concludes with a discussion of the reason for MLCNY's success. (ESR)

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22-28 août 1982
Fédération internationale des associations
de bibliothécaires et des bibliothèques

networks
48th IFLA General Conference – Montréal
August 22-28, 1982
International Federation of Library
Associations and Institutions

IFLA GENERAL CONFERENCE, MONTREAL 1982

Division: Special Libraries

Section: Biological & Medical Sciences Libraries
Art Libraries

87 BIOL / ART 13 - E

175 - RE

VIDEODISC TECHNOLOGY AND APPLICATIONS

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Meeting: AS
SI yes/no

VIDEODISC TECHNOLOGY AND APPLICATIONS

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ABSTRACT

Videodisc technology has generated interest in the potential uses of this medium which combines video electronics technology with mass replication processes. The characteristics of this mass storage medium, especially its random access capability under computer control, has stimulated the design and development of a variety of new interactive educational systems.

This paper examines the videodisc player and the premastering of audiovisual material to produce an interactive audiovisual videodisc. Also included is an overview of the different videodisc systems and their mutual interchangeability. Both software development and the audiovisual production process are presented.

VIDEODISC TECHNOLOGY AND APPLICATIONS

INTRODUCTION

Videodisc technology has captured the imagination of potential users in the entertainment education and publishing industries since a demonstration of its feasibility in 1972 by the Philips Research Laboratory. Although recent business events as well as continuing changes in both videodisc products and services indicate that it is too early to predict which companies will succeed in developing and maintaining a profitable videodisc market, it is of interest to evaluate the application potentials of this technology in light of its limitations and problems.

Notwithstanding a host of yet to be solved technical problems, the videodisc promises to be a valuable medium for storage and retrieval, and in the long-run should establish its position within various segments of the economy. This assessment is based mainly on two characteristics of the videodisc and its player.

The first is the videodisc's potential use as an inexpensive storage medium. This is due to the low unit costs permitted by economies of scale arising from its ability to be mass replicated.

The second factor is the structure of the videodisc player which is ideally suited to interface with computers, including low cost personal computers. However, the future of the videodisc is mainly dependent upon the ability of the industry to successfully solve problems in the manufacture of discs and also the development of user software services. Not only must a high yield profitable consumer videodisc mastering process be perfected by the manufacturer,

it is also important for industrial videodisc users to gain access to premastering facilities at an affordable cost.

Compatibility

Ironically, a key property of the videodisc, its ability to be mass replicated, is partly nullified by the disc manufacturers' continuing inability to develop a standard videodisc format. Presently, there are four different formats [1] competing for user acceptance:

- o Laser Optical Reflective (LOR)
- o Laser Optical Transmissive (LOT)
- o Capacitance Electronic Disc (CED)
- o Video High Density (VHD)

Videodiscs using each of these formats share certain similar features: for example, they are all round-shaped plastic platters, and frequency modulation is used to encode video and audio signals [2]. However, there are significant differences in both their physical structure and in their signal format.

The earliest of the laser-based systems, the Laser Optical Reflective (LOR) disc, uses an optical detection system to receive and demodulate a reflected laser beam from the surface of the disc. The disc itself is 30 cm in diameter, and contains 54,000 spiral tracks time per side. LOR discs are produced in two forms: the more standard Constant Angular Velocity (CAV) type that rotates at 1800 rpm providing 30 minutes of playing; and a Constant Linear Velocity (CLV) type whose rotation rate varies between 600 and 1800 rpm, providing 60 minutes of playing time per side.

The Laser Optical Transmissive (LOT) disc also uses an optical detection system.

However, in this case, the laser beam is transmitted through the disc which is transparent, and detected on the opposite side. An advantage of the transmissive system is that it eliminates the need to remove and turn over the disc to gain access to information on the adjacent side. Its detection system can read both sides of the disc by electronically changing its focal point. But unlike the semi rigid structure of the reflective disc, the LOT disc is made of flexible plastic and requires the use of a caddy for protection. The transmissive disc is similar to the CAV type of reflective disc in that both 30 cm standard discs rotate at 1800 rpm and provide 54,000 frames of video per side.

In contrast to the optical videodiscs, LOR and LOT, the Capacitance Electronic Disc (CED) is constructed with grooves and detects its signal by means of a stylus which physically rides on the disc surface. Signal transfer for the CED occurs by sensing the change in the electrical capacitance of the stylus electrode as it rides over the grooves. Rotating at a rate of 450 rpm, the CED provides 60 minutes of video per side but uses a less complex electronic system than the optical videodisc. On the other hand, it fails to provide the special features available on the laser systems, such as:

- Slow motion
- Stop motion
- Single frame playback
- Forward and reverse playback
- Direct Access

In addition, the physical contact of the stylus with the reading surface is expected to cause degradation in signal quality earlier than the optical disc.

The fourth and latest addition to this competitive field is the Video High Density (VHD) System. It is a grooveless capacitance detection system. It uses a 25 cm disc which rotates at 900 revolutions per minute and provides 60 minutes of video per side. Because detection is based on a non-contact system, it has better wear characteristics than the CED disc, and in addition, it is capable of some of the special features available on the optical videodisc systems. All four formats allow mass replication and therefore may be used to provide video for the entertainment market. And, indeed, there is a consumer videodisc player for each of the basic formats, both optical and capacitance. Even Thomson-CSF which originally entered the videodisc market with only an industrial player for their laser optical transmissive, is now planning the production of consumer disc models [3].

To better understand this change in direction which is similar to the type of changes being considered by other videodisc manufacturers, it may be worthwhile reviewing past milestones in the history of the videodisc industry.

BACKGROUND

Although the history of disc recording dates back to the first recording and playback of Thomas Edison's voice on a wax cylinder in 1877, the first video recording was demonstrated in 1972 by the Philips Research Laboratories of Eindhover, the Netherlands [4]. This event created an atmosphere

of anticipation and excitement in the electronic industry which has yet to settle.

Two years later, Philips joined with MCA to announce an agreement to use a common format for videodisc software, an agreement that was considered to be a major milestone. However, a month later Thomson-CSF demonstrated their LOT system in Cannes, France. Their system was different from Philips' in that it employed a transmissive record and playback technique. This was followed by RCA which introduced yet a third system in 1975, their Selectavision disc.

In the ten years following the Philips Research Laboratories demonstration, videodisc technology has been favorably viewed by a number of major companies that have entered the field either alone or in partnership with others. For example, MCA and Pioneer formed a joint venture in 1977 to produce videodisc players. Other companies that followed suit have included Sony, Magnavox, Matsushita, Hitachi, IBM and Zenith.

In September 1979, IBM joined MCA to form Discovision Associates. Their announced plans to manufacture videodisc products for industrial, entertainment and educational users opened the videodisc production market to a number of small audiovisual production facilities throughout the United States. Discovision agreed to master and replicate videodiscs for individual customers who were allowed to supply video source material in a variety of tape and film formats.

Sony followed Discovision by establishing an American outlet to their mastering facility in Japan, but required that all source materials be edited and provided on one-inch type C format videotape. Later, the 3M Company opened a facility to master videodiscs compatible with the Philips/MCA and

Thomson-CSF players. As in the case of Sony, 3M also required source materials to be edited and provided on one-inch Type C videotape.

After three years of operations and amidst constant rumors of production problems, IBM discontinued their relationship with MCA and turned over their interests to Pioneer Electronics Corporation of Japan [5]. The Wall Street Journal reported that more than 100 million dollars were invested in Discovision [6] to get that operation off the ground. Yet, despite that level of investment and a large projected market, the Discovision plant in Carson, California failed to achieve its production goals.

This lack of success has also been shared by RCA. In February 1982, the Wall Street Journal reported that RCA spent more than 200 million dollars on its stylus-read videodisc system, but that the sales of its players have been dissapointing [6]. Nevertheless, RCA's Group Vice President, James Alic, reported that the company is looking for an investor to build a facility to master their discs for industrial and educational use [7].

SYSTEM USAGE

Although it might appear that Thomson-CSF and RCA may be simply exchanging problems, the former by entering the consumer market and the latter by stepping into the industrial arena it is also possible that a successful strategy might be to produce both consumer and industrial systems.

While the consumer disc is targeted for home movie entertainment, the industrial disc has to provide an interactive capability for the industrial and educational user. Not only is the user population different for the consumer and industrial disc, so is the competition each faces. The consumer disc must compete with the 1/2 inch video cassette recorder (VCR). To date, the VCR appears to offer more appeal to the home user. In 1982, while RCA

reported disappointing sales of their videodisc systems sales, Matsushita Electric announced an increase in their VCR's sold from 13% to 20% of total sales [8].

The marketing strategy announced by videodisc manufacturers when their products were first introduced was to produce discs inexpensively and to price both discs and players below the cost of the VCR tapes and player units. However, the cost of videodiscs have not dropped to the low levels anticipated. Compounding their problems are home movie vendors who have developed low cost rental services providing movies on videotape for a rental fee of about $5, considerably less than the $20 purchase price of a videodisc. Also, the videodisc players were initially introduced at a price comparable to the VCR units, in the $500 range. Only recently has RCA and Zenith reduced the price of their players to below $300.

In contrast to the competition facing the consumer players, the industrial videodisc system is compatible with the small computer. The industrial player is designed to interface with small computers, and store information which is supportive of the use for small computers. Problems exist, however, in both price levels and applications. The industrial disc systems are priced around $3000, which is out of the range of most home users. In addition to the purchase cost are the costs associated with developing applications for the industrial unit.

Prior to exploring the development of application software, it may be worthwhile to consider the definition of an industrial videodisc system. When videodisc systems were first introduced, the industrial videodisc systems were listed as those with a built-in microprocessor, such as the DVA 7820 optical videodisc model. These externally controllable systems were intended

to provide storage and retrieval for interactive use, in contrast to the less expensive consumer systems which were designed primarily for entertainment. While such simple definitions may apply to some systems, there are exceptions. For example, the Pioneer VP-1000 was introduced as a consumer player, however it has an external interface as well as some of the built in control features of the industrial system. In addition, the utility of the VP-1000 is further enhanced by the availability, from independent vendors, of low cost computer interface cards for the home computer. By interfacing one of these cards, costing approximately $50, to a $750 VP-1000 the user has a $1000 home computer peripheral. In contrast, an industrial videodisc system used in a comparable way would cost over $3000. This overlapping capability, especially with the price difference, causes some uncertainty in the classification of consumer and industrial systems. Of course, there are additional standalone features which are included in the industrial system. The industrial videodisc player with its built-in microprocessor is a programmable standalone interactive educational system, via its hand held remote control unit. And it is self programmable from the computer data encoded onto the videodisc. The flexibility of the videodisc system as an interactive system is determined by the audiovisual material and the computer program which is developed prior to the mastering process, and encoded onto the disc during mastering. The process of creating the visual and audio material and the control software is called premastering.

PREMASTERING

The premastering process consists of the following five functions:

- Image Capture
- Processing
- Signal Encoding
- Assembly
- Simulation

The importance of each of these functions is determined by the intended use of the disc. The content material to be recorded on the disc may consist of varying proportions mixtures of motion sequences, still frames, audio and computer data. Each side of the disc can include the following options:

- One full hour of motion video with audio (consumer disc)
- Approximately 10^{10} bits of digital data (special application)
- One-half hour of motion video
- One-half hour of audio
- 54,000 frames of still images per side
- Preprogrammed instruction for the internal microprocessor

Premastering of industrial videodiscs for interactive educational systems is normally limited to combinations of the latter four options. A lot of creativity possible in the premastering process depends on tne producer's understanding of the medium as well as the needs of the end user.

The image capture process involves the conversion of visual imagery into video format, either motion or still-frame sequences. This initial stage in the premastering process is critical because it provides the basic material for the subsequent steps. Image capture includes:

- Video camera capture of live subjects and events
- Videotape format conversion
- Film-to-video conversion

- 35 mm slide-to-video conversion
- Graphics-to-video conversion

Following the capture of source material the next required phase is processing. During this phase the producer can modify source material and improve the output product through various enhancement techniques, depending on the level of sophistication of the equipment available in the premastering facility. Techniques in image processing and computer graphics areas can be used to enrich the quality of captured material. For example, special effects can be used to add the appearance of motion to a captured still photograph. Also, computer-generated graphics may be superimposed onto existing material to highlight visual content.

To control the presentation of the audiovisual material on the videodisc, the built-in microprocessor in the player may be programmed with signals encoded on the disc. For example, the DVA Model 7820 industrial videodisc can transfer a computer program recorded in its second audio channel to the built-in microprocessor. This process of transferring information from the audio channel to the microprocessor is termed "dumping". The computer program dumped into the microprocessor provides the control signals necessary to automatically sequence the images on the disc, or to select different modes such as freeze frame, normal motion or slow motion. To utilize the system's dump capability the producer must develop the computer program during the premastering process and provide this to the manufacturer for disc mastering.

If the manufacturer requires all material edited and in final format, the producer must make available the actual encoded digital signal rather than simply the computer program listing. This requirement involves sophisticated premastering facilities for signal encoding in addition to the audiovisual processing capabilities.

The next phase, assembly, is also a process which varies in complexity depending upon the degree of finality imposed by the manufacturer for disc mastering. Again when a final edited premastered tape is required, the producer is required to complete more processes, and with a greater degree of accuracy, during the premastering phases. As such, the assembly process includes the placement of materials in the correct sequence and the assignment of an identification number to each video frame. If still frame retrieval is required by the user, then it is also critical that the frame number be identified within the correct field of the frame. An error in this process, called field identification, will introduce a phenomenon termed "frame flicker" which is the alternation of two fields, each from a different frame. Visually, it is seen as the superposition of two different images, and can be quite disconcerting to the viewer.

A number of the potential mistakes made during the asembly process can be detected prior to mass replication of the disc if the producer simulates the system. Simulation can be incorporated into the premastering process or can be accomplished at a later phase using the "check disc" from the manufacturer. This check disc is a prototype of the master disc. A premaster simulator is usually a videotape driven system which simulates the search and retrieval operation of the videodisc player. The type of errors that simulation can highlight include:

- Sequencing
- Field identification
- Signal quality
- Frame flicker

CONCLUSION

The key attributes of the videodisc which account for its value to the entertainment and educational users are its suitability for mass replication and its compatibility with the computer. Stated differently, the disc is a good medium for electronic publication. However, unlike traditional publication products which use paper as the medium, the disc requires that the user provide a compatible player. And thus far the industry has not been able to establish a standard format. Indeed, this lack of standardization in the optical disc systems provides the rationale for the development of the nonoptical videodisc system. The manufacturers of these capacitance disc systems believe that their simpler systems can be sold less expensively, and in the long term will operate more reliably.

A problem which videodisc electronic publication does shares with traditional publications is that of indexing. With a potential storage capacity of 54,000 video frames, each of which is individually retrievable, a usable index must be available. Because the videodisc is computer compatible, the index can be software-based, giving it advantages over conventional indexing in traditional publications. Indexing in the case of the videodisc can include features such as menu selection and internally programmed search and retrieval techniques.

To encourage applications that utilize the full potential of the videodisc, the following conditions are needed: a stable manufacturing environment, an increasing number of users with compatible videodisc players, decreasing costs in replicating the discs and access to premastering service at an affordable cost.

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Associations and Institutions

1982

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THE MEDICAL LIBRARY CENTER OF NEW YORK
an independent, privately-funded network

103 – RE

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The Medical Library Center of New York (MLCNY) was established as an independent, not-for-profit corporation under the Education Law of the New York State Board of Regents in 1959. A pioneering activity in biomedical information networking, The Center continues to serve as an international model for developing cooperative programs.

While the need for library cooperation was frequently discussed by the general New York library community during the postwar era and the 1950's, it was the directors of the New York City medical resource libraries, under the leadership of Gertrude Annan, then Librarian at the New York Academy of Medicine, who provided the impetus for formal organization. The Center was founded to provide solutions to problems shared by these metropolitan libraries, including physical space limitations, the lack of union lists, and the use of divergent cataloging systems. These latter two points created serious barriers for the development of organized resource sharing programs.

The founding institutions of The Center were the medical schools of Columbia, Cornell, New York University, Yeshiva, and New

York Medical College, as well as the New York Academy of Medicine, Memorial Sloan-Kettering Institute and the Rockefeller Institute. The Sponsoring Institutions set forth the purposes as follows:

- To provide rapid access to a centralized depository collection of less-used materials.
- To maintain a union list of current medical periodical literature available in the New York area.
- To develop uniform systems of cataloging.
- To provide additional stack facilities and book storage.
- To facilitate the acquisition and sharing of medical books and periodicals.
- To provide facilities for research and experimentation in the field of medical library practice and administration.

Although the 1982 membership of The Center has grown to fifty-six institutions, each with diverse missions and information needs, it is significant that the initial goals and objectives of MLCNY remain viable twenty-three years later. In addition to mounting programs directed at its chartered mission, MLCNY has emerged as a leader in the application of automation technology to cooperative technical services programs.

Membership Structure

MLCNY Member Institutions belong to one of the three membership categories: Sponsoring, Participating, or For-Profit Institutions.

Sponsoring Institutions include the medical schools and the larger research centers such as the Memorial Sloan-Kettering

Cancer Center. MLCNY is governed by a Board of Trustees whose members include the Dean or the chief administrator of each Sponsoring Institutions. Sponsoring Institutions share legal responsibility for The Medical Library Center, and jointly they hold equity in its assets. Each of the eleven Sponsoring Institutions is assessed $11,000 per year for core services.

The second level of membership, the Participating Institution category, is composed of forty-one not-for-profit hospitals, both public and private, and not-for-profit health organizations such as The American Health Foundation. Participating institutions pay an annual membership fee of $5,000.

Finally, the For-Profit Institution category was designed to accommodate pharmaceutical houses who had requested membership. The four member institutions in this category contribute $7,500 annually for services.

Finances

MLCNY's operations budget in Fiscal Year 1982 is projected at $883,600. $350,000 in annual membership fees support collection maintenance, document delivery from the depository collection, messenger service, automated serials exchange, Union Catalog of Medical Periodicals (UCMP) database participation, reference service for interpretation of the Center's collection, and consultation services. The Medical Library Center offers a number of extramural services, e.g., cooperative cataloging

via OCLC and an automated serials control service, all on a fee-for-service basis. Interlibrary loan, union catalog, and extramural services are brokered to non-member institutions at a fee which includes indirect costs.

Programs and Services

The Medical Library Center of New York's Headquarters is located at 5 East 102nd Street in Upper Manhattan. In 1962, MLCNY purchased a building which housed an indoor parking garage adjacent to The New York Academy of Medicine. The seventh floor was renovated to furnish office and book stack space, and one-half of the sixth floor provided a loft-space storage area. In June, 1982, MLCNY sold this property to Mount Sinai School of Medicine. The Center will continue to occupy its 45,000 square foot home on a long-term, lease-back basis.

Central to MLCNY activites is the depository collection of over 350,000 items. The MLCNY serials collection contains 11,570 distinct titles in the health and allied sciences. This collection includes 77,793 bound serial volumes, the majority of which were received by transfer from member institutions. The Center subscribes to only 47 serial titles; these subscriptions are concentrated in three areas: Japanese language publications, veterinary medicine journals, and library and information science titles. The Center actively acquires only those titles which complement the Member Institutions' holdings. MLCNY also collects monographs, serves as a U.S. Federal Government

Depository Library for health and environmental publications, and acquires foreign biomedical dissertations; these materials number 270,000 volumes. While MLCNY maintains one of the largest collections of health science information in New York, The Center does not serve users directly. The Medical Library Center is a library for other libraries.

The primary mechanism used to disseminate the MLCNY collection resources is the interlibrary loan program. Annually, MLCNY fills over 30,000 interlibrary loan requests for health professionals at Member Institutions. Daily messenger service to Member Institutions assists in maintaining a twenty-four hour processing and delivery turnaround time. Three messengers leave Headquarters each morning and travel a total of 230 miles each day. When MLCNY itself is unable to satisfy an ILL request, Member Institutions reciprocate with other Members. In 1981, the MLCNY ILL network satisfied 118,000 ILL requests, with all fees covered by the annual membership fee.

The Union Catalog of Medical Periodicals (UCMP) program began in 1961 in order to address the chartered mission of maintaining a union list of current medical literature in the New York area. Under the direction of Jacqueline Felter, this union catalog was designed from the outset as an automated system. MLCNY continues to maintain the system in a batch process mode; however, the MLCNY Board of Trustees recently approved an upgrade to an online maintenance and retrieval system.

UCMP has grown into the largest health science union catalog of serials with verified bibliographic data, now including both current and retrospective titles. UCMP includes 59,000 distinct main entries, and 240 health science libraries in New York and New Jersey contribute holdings information. Participating libraries submit updates to UCMP throughout the year. Quarterly, MLCNY updates and reproduces the entire database on microfiche. Furthermore, institutions can receive individual library output in paper, microformat, or machine readable tape formats. Because UCMP contains issue specific holdings statements, it facilitates precision location for interlibrary loan and serves as the primary serials inventory control record for participating libraries. UCMP bibliographic data can be used to create separate union lists, as in the case of Illinois and Texas where local holdings information is linked to UCMP bibliographic data. Another example of the application of UCMP's bibliographic data is its use in the production of the Medical Library Association publication "Vital Notes on Medical Periodicals."

The MLCNY Serials Desiderata Service, essentially a serials exchange program, is another automated system designed to promote resource sharing among member institutions. Participants report serial issues and volumes needed to fill gaps in their collections, and MLCNY updates an automated file and distributes quarterly lists. Although this serials exchange program parallels others, such as the Medical Library Association's exchange,

7,500 items were supplied in 1981, clearly justifying the existence of this local program. Perhaps the success of MLCNY's program can be attributed to the ease with which materials can be forwarded via the MLCNY messenger service, thus eliminating costly handling and postage charges.

To insure the availability of biomedical serials resources at the local level, MLCNY maintains a serials rationalization program known as the Regional Coordination of Biomedical Information Resources (RECBIR). Participating libraries, which are larger research libraries, have made commitments to maintain subscriptions to specific journal titles. The RECBIR operation monitors the region's serials acquisition and cancellation activity, seeking additional commitments when necessary. RECBIR has been effective in insuring that all libraries do not cancel expensive, less-used titles concurrently, and many institutions base acquisition decisions upon RECBIR commitment activity. During the coming year, MLCNY plans to expand the RECBIR program to the sub-consortium level to enable hospital libraries to become more self-sufficient in satisfying their information needs.

Since its inception, a variety of funding sources have supported the RECBIR program. While RECBIR was developed and maintained on grant funds during the first six years, participating libraries paid for the program's coordination for several years when outside funding was not available. Since 1980,

RECBIR has been funded by the Regional Medical Library Program and many program enhancements have been accomplished. Yet, if RML funding ceases in the future, MLCNY anticipates that participants again will pay to maintain the program, even during this time of budgetary constraint. A recent survey of the MLCNY membership revealed that RECBIR is rated as one of MLCNY's three most important programs, the others being interlibrary loan and UCMP.

Traditionally, Monograph and audiovisual interlibrary loan activity was hampered in New York and New Jersey by the lack of union lists. Even with the advent of OCLC in 1976, there were no subject or added entry access points. Equally important, most hospital libraries opted not to use the OCLC bibliographic utility because of the prohibitive price structure and were thus unable to take advantage of the OCLC location feature. To correct this situation, MLCNY produced the first edition of the Union Catalog of Medical Monographs and Multimedia (UCOM) in microfiche format in January, 1979. In 1981, UCOM was upgraded to an online file to accommodate quarterly updates and permit searching using boolean operators. UCOM is mounted as a private, online file on the computer facilities of Bibliographic Retrieval Services, Inc., and the database can be searched via the same dial-access terminal used for MEDLINE database searching. The UCOM master file was created from MLCNY specifications by reformatting and merging the MARC archival tape records of thirty-three health science libraries

to produce a database of 116,000 records. Records from sources other than OCLC will be added in the future, and MLCNY now is creating a program which will sort the file for microfiche output.

A popular extramural service is the MLCNY/OCLC Cooperative Cataloging Service, which makes OCLC processing cost effective for the library cataloging under 1,000 titles per year. Participants share expenses for personnel, supplies, and terminal amortization, maintenance, and telecommunication. During 1981, MLCNY processed 8,180 items for 23 network libraries. These participants receive the benefits provided by the OCLC system such as archival tapes, card production, and accession lists, while having the advantage of a second review of cataloging work by MLCNY Technical Services staff to ensure that all work conforms to national standards. Also, MLCNY has the capability of producing spine labels for participants using its OCLC printer, thus eliminating another labor intensive step at the local level.

Another extra-mural service is the PHILSOM EAST Network. In 1973, MLCNY replicated an automated serials control system for regional participants. PHILSOM (Periodicals Held in Libraries of the Schools of Medicine) is based on the original system developed at the Washington University School of Medicine in St. Louis. MLCNY now serves eleven PHILSOM libraries. Through PHILSOM, MLCNY offers an efficient automated processing and

inventory control mechanism with numerous long-term benefits, e.g., a verified bibliographic database, automated claims notification, and current serials holding data for library staff and users available in multiple copies.

From this brief overview of The Medical Library Center's programs, it is evident that the MLCNY operation is multifaceted and complex. To conclude, this paper will review the elements which contribute to MLCNY ongoing success as a privately funded network.

Conclusion

Why has the Medical Library Center of New York continued to remain a healthy institution when similar cooperative ventures have failed?

A major element in MLCNY's successful growth can be attributed to the perceptive librarians who designed The Center. These founders realized that the short and long term needs of the New York biomedical library community could best be satisfied through networking and increased network participation. To cite one area, while most health science libraries in the metropolitan area had adequate space for collection growth in the late 1950's, many reached a physical limit during the 1970's. In fact, a number of MLCNY Member Institutions now must withdraw one volume from the collection when another volume is added. The Center offers an ingenious solution to

this plight, which then becomes a hidden incentive for continuing Center membership: member libraries transfer materials to MLCNY, knowing that the volumes will remain in the MLCNY collection in perpetuity and will be readily available via the delivery service. As member libraries transfer major sections of their collections to MLCNY, The Center truly becomes an extension of their own libraries' collections.

Secondly, networking programs which exist as independent agencies seem to have a better prognosis for survival. MLCNY could have been established under the aegis of a New York City medical school. While, initially, cooperative efforts may have thrived, one can imagine that the sponsoring institution's own goals and needs would begin to color those of the network. Common sense suggests that even if the medical school's needs did not influence the cooperative program's direction, other participating institutions probably would suspect that they did, and the disintegration of multi-institutional cooperation would proceed. Because of the independent governance structure, MLCNY staff can work as change agents; analyzing, implementing and marketing services in response to membership needs, but not subservient to them.

Thirdly, New York City provides an environment which is conducive to biomedical library cooperation. Even before the introduction of a formal network, the spirit of cooperation among medical librarians had been strong, propinquity being perhaps the

motivating element. MLCNY helped to open the rich private and special library collection, and the cooperative spirit has flourished as the health care community reaps the tangible benefits of improved access to information.

Finally, MLCNY has implemented, adjusted, and even eliminated programs in harmony with the impact of external elements, such as the integration of new technology to expedite the transfer of information. In order to remain viable on a long term basis, networks must continually evaluate programs and modify policies to reflect the changing needs of the participants, for resistance to change can prove fatal to a network. The Center uses a committee structure to codify long range plans and to study individual programs. Through these advisory and planning committees, the membership is provided with a channel for articulating their needs, concerns, and wishes. While MLCNY is committted to change, responsible management mandates that recommendations be evaluated to insure that the necessary economic and human resources are available. The correct balance between these two forces has given MLCNY stability in the past, and it should continue to strengthen the network during the coming years.